

What is claimed is:

~~Sub Q'~~ 1. A terminal for receiving and processing a multimedia data bitstream, comprising:

- a terminal manager;
- a composition engine;
- a plurality of content decoders; and
- a presentation engine; wherein:
 - said content decoders recover and decode multimedia objects from respective elementary streams of the bitstream;
 - said multimedia objects comprising at least one of video objects and audio objects for presentation in a multimedia scene;
 - said composition engine recovers scene description information from the bitstream that defines specific ones of the recovered multimedia objects that are to be provided in the multimedia scene, and characteristics of the recovered multimedia objects in the multimedia scene;
 - said terminal manager recovers object descriptor information from the bitstream that associates said recovered multimedia objects with respective ones of said elementary streams, and provides the recovered object descriptor information to said composition engine;
 - said composition engine is responsive to said recovered object descriptor information provided thereto and said recovered scene description information for creating a list of said specific

0001424200
- 424200

ones of the recovered multimedia objects that are to be displayed in said multimedia scene; and

said presentation engine obtains said list from
said composition engine, and, in response thereto,
retrieves the corresponding decoded multimedia
objects from said content decoders to provide data
corresponding to the multimedia scene to an output
device.

2. The terminal of claim 1, wherein:

said composition engine and said presentation engine have separate control threads.

3. The terminal of claim 2, wherein:

said separate control threads allow the presentation engine to begin retrieving the corresponding decoded multimedia objects while the composition engine recovers additional scene description information from the bitstream and/or processes additional object descriptor information provided thereto.

4. The terminal of claim 1, wherein:

said content decoders, presentation engine and composition engine have separate control threads.

5. The terminal of claim 1, wherein:

said characteristics of the recovered multimedia objects in the multimedia scene include positions of said specific ones of the recovered multimedia objects in said multimedia scene.

6. The terminal of claim 1, wherein:
said recovered scene description information is
provided according to a Binary Format for Scenes
(BIFS) language

7. The terminal of claim 1, wherein:
said multimedia data bitstream is provided
according to an MPEG-4 standard.

8. The terminal of claim 1, wherein:
said composition engine maintains scene graph
information of a composition of said multimedia
scene in response to said recovered object
descriptor information provided thereto and said
recovered scene description information for use in
creating said list.

9. The terminal of claim 8, wherein:
said composition engine updates the scene graph
information, and said list, as required, for
successive multimedia scenes in response to
subsequent recovered scene description information
from the bitstream.

10. The terminal of claim 8, wherein:
said terminal manager is responsive to user
input events at a user interface for providing
corresponding data to said composition engine for
modifying said scene graph, and said list, as
required.

00000000000000000000000000000000

11. The terminal of claim 1, wherein:
said composition engine provides said list to
said presentation engine according to a specified
presentation rate.

12. The terminal of claim 1, wherein said
multimedia objects comprise video and audio objects
for presentation in the multimedia scene, further
comprising:

video and audio buffers for buffering the video
and audio objects, respectively, prior to
presentation;

wherein said presentation engine reads objects
from said list and provides them to the appropriate
one of said video and audio buffers.

13. A terminal for receiving and processing a
multimedia data bitstream, comprising:

decoding means for recovering and decoding
multimedia objects from respective elementary
streams of the bitstream;

said multimedia objects comprising at least one
of video objects and audio objects for presentation
in a multimedia scene;

composing means for recovering scene
description information from the bitstream that
defines specific ones of the recovered multimedia
objects that are to be provided in the multimedia
scene, and characteristics of the recovered
multimedia objects in the multimedia scene;

00000000000000000000000000000000

managing means for recovering object descriptor information from the bitstream that associates said recovered multimedia objects with respective ones of said elementary streams, and providing the recovered object descriptor information to said composing means;

said composing means being responsive to said recovered object descriptor information provided thereto and said recovered scene description information for creating a list of said specific ones of the recovered multimedia objects that are to be displayed in said multimedia scene; and

presenting means for obtaining said list from said composing means, and, in response thereto, retrieving the corresponding decoded multimedia objects from said decoding means to provide data corresponding to the multimedia scene to an output device.

14. A method for receiving and processing a multimedia data bitstream at a terminal, comprising the steps of:

recovering and decoding multimedia objects from respective elementary streams of the bitstream at respective content decoders;

said multimedia objects comprising at least one of video and audio objects for presentation in a multimedia scene;

recovering scene description information from the bitstream that defines specific ones of the recovered multimedia objects that are to be provided

09/23/2002 - 4224200

in the multimedia scene, and characteristics of the recovered multimedia objects in the multimedia scene;

recovering object descriptor information from the bitstream that associates said recovered multimedia objects with respective ones of said elementary streams;

creating a list of said specific ones of the recovered multimedia objects that are to be displayed in said multimedia scene in response to said recovered object descriptor information and said recovered scene description information; and

retrieving the corresponding decoded multimedia objects in response to the list to provide data corresponding to the multimedia scene to an output device.

15. The method of claim 14, wherein:

said recovering steps are performed using control threads that are separate from said retrieving step.

16. The method of claim 15, wherein:

said separate control threads allow the retrieving of the decoded multimedia objects to begin while the recovering of additional scene description information and/or the recovering of additional object descriptor information occurs.

17. The method of claim 14, wherein:

DOCUMENT # 122200

0 5 7 3 5 4 4 7 1 1 2 3 4 2 0 0
said creating step is performed using a control
thread that is separate from said retrieving step.

18. The method of claim 14, wherein:
said recovering steps and said creating step
are performed using control threads that are
separate from said retrieving step.